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ABSTRACT

A practicum intervention designed to improve the basic skills of second and fourth graders by means of computer-assisted instruction was implemented. The intervention focused on improving students' mathematics and writing scores on the Student State Assessment Test (SSAT), a test administered state-wide to third and fifth graders every year. Staff development activities, administrative and supervisory activities, and student and classroom activities were implemented concurrently. Staff development activities focused on increasing teachers' knowledge of computers and computer-assisted instruction. Administrative and supervisory activities concentrated on establishing the target group and developing a computer-assisted instructional program that would insure that students mastered required skills. Student and classroom activities involved at least two 30-minute sessions in the computer laboratory with a computer aide and use of the computer in the classroom. Results of the SSAT indicated that the program was not effective in remediating students' deficient skills. Mastery in the context of the computer laboratory did not always transfer to testing. Teachers did not demonstrate commitment to the program. Related materials, including survey instruments, and an annotated bibliography of 19 citations are provided. (RH)

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USING COMPUTER-ASSISTED INSTRUCTION

to

IMPROVE BASIC SKILLS in SECOND AND FOURTH GRADES

by

Judith Mager

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A Practicum Report

submitted to the Faculty of the Center for the Advancement of Education at Nova University in partial fulfillment of the requirements for the degree of Educational Specialist.

The abstract of this report may be placed in a National Database System for reference.

June/1989

Authorship Statement

I hereby testify that this paper and the work it reports are entirely my own. Where it has been necessary to draw from the work of others, published or unpublished, I have acknowledged such work in accordance with accepted scholarly and editorial practice. I give this testimony freely, out of respect for the scholarship of other workers in the field and in the hope that my work, presented here, will earn similar respect.

Signed Judith Mayes

Abstract

Second and Fourth Grade Skills Mastery Improvement Through Computer-assisted Instruction.
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Descriptors: Computer-assisted Instruction/Inservice Teachers Education/Elementary Education/Curriculum Development/Elementary School Mathematics/Computer Literacy/Computer Uses in Education/Computer Managed Instruction/Educational Trends/Teacher Education/Teaching Methods/Computer Oriented Programs.

The decrease in scores in mathematics and writing on the Student State Assessment Test of third and fifth grade students was addressed by the implementation of a computer-assisted instructional program in an urban elementary school. The objectives were to increase the number of skills mastered on a practice test by 80 percent of the students in the target group, to increase the knowledge of the computer and computer-assisted instruction of the teachers of students in the target group. The program contained three components: staff development activities, administrative/supervisory activities, and student/classroom activities. All were implemented concurrently. Staff development activities focused on increasing the knowledge of the computer and understanding of computer-assisted instruction of the teachers of students in the target group. Administrative/supervisory activities concentrated on establishing the target group and developing a computer-assisted instructional program to ensure skills mastery. Student/classroom activities involved at least two 30 minute sessions in the computer laboratory with a computer aide as well as additional computer time within the classroom. The Sample Statewide Student Assessment Test was the instrument utilized to determine the target group as well as measure mastery. The results indicated that the program of computer-assisted instruction as

implemented is not effective in ensuring skills mastery when used in isolation. Skills mastery in the computer laboratory was not always transferred to the Sample Statewide Assessment Test. The teachers of the target group did not demonstrate commitment to the concept. Appendices include teachers' surveys, student surveys, a revised minimum standards performance profile, an all purpose computer chart, and student data.

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CHAPTER I

Purpose

The school was situated in the western part of a southern metropolitan city. During the 1988-1989 school year, the area was experiencing a transition. The core of the school community consisted of homes which were built 25 years ago around small lakes. The area was surrounded originally by agricultural land which has within the last three years been rezoned as commercial and residential. A new interstate expressway had just been completed to the west of the school site. New single family as well as multi-unit residences had been completed and others were in various stages of construction.

The socioeconomic characteristics of the community were varied. There were several large apartment developments in the low-middle rental range, including a 400 single-family development with custom-built homes beginning in the $225,000 range, as well as single

family and townhomes in the middle income range. Most families were supported by two working parents. The school also boasted a large volunteer program.

The school facility was constructed in 1969 utilizing the open classroom concept. It had a permanent and temporary capacity of 975 students. The permanent building was designed to house 3 classes in each pod area. The student population had risen from a 1986- 1987 school year high of 1,460 students or 148 percent capacity to a September 1988 population of 1,676 students or 171 percent capacity. In the 1988-89 school year there were approximately 6 teachers in each pod area with a pupil/teacher ratio of 31:1. There were 80 members of the instructional staff with 12 working in portables.

Four additional portables had been placed on the site within the month of December 1988, and the school system was constructing 4 portables on the site at an additional cost of $25,000 each. A new elementary school had been planned to the east of the school to relieve overcrowding. The targeted completion date of the new school was April 1989. A new wing consisting of 8 classrooms was in the fifth year (1993) of the

county's 5 year plan for capital improvements with no anticipated construction date assigned.

The ethnic make-up of the student population was changing very slightly each year. It went from 59 percent white Non-Hispanic in 1987 to 53 percent in 1988 with 63 percent of the total school population identified as exhibiting limited English proficiency. The Hispanic population increased from 35 percent to 36 percent, and the Black population shifted from 8 percent to 10 percent. The Asian/American Indian population remained constant at 1 percent. Of this total school population, 141 students (7 percent) were in compensatory education, a state funded program for children who score in the 1 or 2 percentiles in mathematics and reading. The free lunch program served 13 percent of the population and the daily attendance has risen from 94.5 percent in 1986 to 94.7 percent in 1987.

Although the open classroom design had been helpful in accommodating the overcrowded situation, the placement of the 6 classrooms had created space problems as well as unusually high noise levels. The learning environment had become increasingly more

restricted, due to the overcrowded conditions; and creative lessons, using hands-on activities had been eliminated due to space limitations. In 1988 the cross grouping concept had been curtailed due to the logistical problems involving student movement within each pod.

The principal's leadership style was definitely people-centered. In 1988 the local school board approved a concept of teacher participation in school site decision making. At the same time the board stated its desire for some decision-making to be transferred from the district and area levels to the school site. The principal of this school had demonstrated this philosophy by actively supporting this innovation and encouraging teacher involvement in decision-making concerning the school for the 1988-89 school year. His continuing emphasis on providing an atmosphere which focuses on student-centered teaching techniques illustrated another fundamental concept of pragmatism. He geared the curriculum toward stimulating exploration, problem-solving, and the importance of scientific inquiry. This philosophy was evident by the importance placed on inservice courses

provided as well as staff sharing of creative lessons.

This writer was a fifth grade teacher functioning as an administrative assistant to the principal, who was particularly interested in computers because of the statewide emphasis on computer literacy, on which the students will be tested in the 1988-89 school year. The Parent/Teacher Association (PTA) purchased 5 computers in February 1988. An aide was then hired to instruct the students in computer literacy. After assessing the program conducted during the 1987-1988 school year, the PTA had decided to purchase additional computers for the 1988-89 school year dedicating the annual fundraising event to this effort. There were a total of 13 computers donated by the PTA in the school.

The Statewide Student Assessment Test (SSAT), a criterion referenced instrument, was administered in October of every school year to grades 3 and 5 in the elementary schools in the state. The tests assess skills which were present in the curriculum two grade levels below the test grade. Remediation and mastery were mandatory by the state for promotion to the next grade.

Table 1

A Comparison of State Student Assessment Scores

	1986-1987 Writing	1986-1987 Writing	1986-1987 Mathematics	1987-1988 Mathematics
Grade 3	94	93	89	91
Grade 5	94	88	88	86

The SSAT scores substantiated some fundamental strengths and weaknesses within the school. The median percentiles for third grade writing and mathematics improved between the 1986-1987 and 1987-1988 school years. Mathematics showed a 2 percentile increase. Writing, on the other hand, showed a 1 percentile decrease.

The scores in mathematics and writing for the fifth grade, which reflected fourth grade instruction, pointed out a teaching problem in the fourth grade in writing and mathematics. The decrease was substantial in writing. The significant decrease was from a 1986-1987 median percentile of 88. This negative result was the greatest (-6) of all curriculum areas

illustrating the need for additional reinforcement of skills in the writing section of the curriculum. The mathematics median percentiles dropped from the 1986-1987 score of 88 to a 1987-1988 median percentile of 86.

The Stanford Achievement Test - Seventh Edition (SAT), a norm referenced instrument, was administered in each grade level in April of the school year. When all grade levels of the school were compared, an overall increase of 6 median percentiles was recorded from 1985-1986 (46) to 1987-1988 (52). A 3 median percentile increase was attained between 1985-1986 (59) to 1987-1988(62) in the area of mathematics application and a 2 median percentile gain from 1985-1986 (57) to 1987-1988 (59) in mathematics concepts; however, an overall decrease of 3 percentiles was observed between 1985-1986 (64) to 1987-1988 (61) in the area of mathematics computation.

In the fourth grade there had been a steady decline in the median percentiles from a 1985-1986 score of 68 to a 1986-1987 score of 66 to a significant decrease in 1987-1988 score of 54. The decrease in the mathematics concepts median percentiles followed the

same pattern. In 1985-1986 the median percentile was 69. In 1986-1987 the median percentile was 63. It dropped to a 1987-1988 median percentile of only 61, showing an 8 median percentile decrease in 3 years.

Table 2

A Three Year Comparison of Stanford Achievement Mathematics

Scores

	Mathematics Computations			Mathematics Applications			Mathematics Concepts		
	'85	'86	'87	'85	'86	'87	'85	'86	'87
School	64	63	61	59	60	62	57	60	59
Grade 4	68	66	54	62	61	66	69	63	61

The average class size had shown growth in all grades, with a substantial increase of 7 students in grade 2. The average class size grew 3 students in grade 4, and 12 students in grade 5 (Appendix A). The percentage of students who were not promoted increased in second grade from 0.0 in the 1985-1986 school year

to 7.6 in the 1986-1987 school year and in fourth grade from 0.0 in 1985-1986 to 1.7 in the 1986-1987 school year (Appendix B).

The writer surveyed fifty members of the instructional staff with a questionnaire to pinpoint areas of concern to the instructional staff (Appendix C). The teachers were asked to react to 8 statements. Each statement was ranked on a 5 point Likert Scale from 1-very strongly disagree to 5- very strongly agree. Forty-one teachers responded to the statement concerning too many students in the classroom. Forty percent very strongly agreed with the statement that there were too many students in the classroom. Forty-six percent strongly agreed for a total of 86 percent who responded positively to the statement. Two percent were neutral. Two percent very strongly disagreed, and 10 percent strongly disagreed for a total of 12 percent who responded negatively.

Two questions dealt with room for small group or individualized instruction. Forty-one teachers responded to the statement that they need more small group and individualized instruction in the classroom. Thirty-five percent very strongly agreed with the

statement, and 54 strongly agreed, for a total of 89 percent. Nine percent were neutral, while 2 percent strongly disagreed. Curriculum improvements focusing on individualized and small group instruction emerged as a concern of the teachers.

Of the 41 teachers who responded to the statement concerning no room for small group instruction in their areas, 51 percent very strongly agreed and 39 percent strongly agreed for a sum of 90 percent. Three percent were neutral, while 3 percent strongly disagreed and 4 percent very strongly disagreed for a total of 7 percent who responded negatively to the statement. The writer concluded that overwhelmingly, the teachers felt that there was no room for small group instruction, and alternatives had to be arranged.

Forty-three teachers reacted to the statement that the noise level in the pod areas is high. Forty-seven percent very strongly agreed, while 37 percent strongly agreed for a total of 74 percent agreeing with the statement. Two percent were neutral,and 9 percent strongly disagreed.

Forty teachers responded to the statement concerning the feelings of frustration due to the

overcrowded conditions. Four teachers chose not to respond to the question. Eighty percent responded that they were frustrated with 58 percent very strongly agreeing, and 22 percent strongly agreeing with the statement. Four percent were neutral. Eight percent strongly disagreed, and 8 percent very strongly disagreed with a total of 16 percent who did not feel frustrated. One could have concluded that over three/fourths of the instructional staff was frustrated due to the overcrowded conditions.

Concerning comfort in using computer-assisted instruction, 38 teachers responded (Appendix D). More than half of the respondents reacted negatively to the statement which indicated that they were not comfortable. Thirty-two percent very strongly disagreed, and 21 percent strongly disagreed. Eight percent of the respondents were neutral, and 13 percent strongly agreed. Thirteen percent very strongly agreed with the statement that they were comfortable using computer-assisted instruction.

The statement concerning knowledge of how to use computers to assist classroom instruction was answered by 41 teachers. Fifty-six percent very strongly

disagreed with the statement that they considered themselves to be computer literate. Seventeen percent of the respondents strongly disagreed for a total of 73 percent of the respondents stating that they had no knowledge, leading one to believe that an inservice was needed. Seven percent were neutral and 20 percent strongly or very strongly agreeing with the statement.

A survey of four hundred and four students was conducted to determine their perceptions of the school environment and computer use in instruction. (Appendix E) They were asked if their pod areas were noisy. Over twice as many students responded affirmatively than negatively in all grades except the sixth graders. Only 33 percent of them stated that the area was noisy. A lower percentage of affirmative answers in that grade was understandable since each sixth grade class was in its own portable classroom.

When asked if it were hard to work in the classrooms, the data was dramatically different. Only 39 percent of the second graders,and 30 percent of the third and fourth graders stated that it was hard to work in the classroom. Sixty-three percent of the fifth grade students, however, stated that it was hard

to work in the classroom. Only 24 percent of the sixth graders found it hard to work in their portable classrooms.

In summary, the scores on the SSAT and the SAT had become a concern of the district as well as the school administrators. The test scores should have been rising; however, they were either stabilized or declining. Writing on the SSAT and mathematics computation and application on the SAT had been identified as areas of special concern. After an analysis of the data by grade levels, specific grades had been isolated as potential problems.

The average class size had increased substantially in grade 2 through grade 6. As a result of an overall student population increase, the pod areas which were designed to house 3 classes now accommodated 5 or 6 classes. The surveys indicated that the high noise levels in the pods created by several large classes confined to small areas were a source of concern for both teachers and students.

A large majority of the teachers surveyed indicated that there were too many students in their classes and that they needed more small group and

individualized instruction. The teachers' survey denoted the frustration of more than three/fourths of the instructional staff due to the overcrowded conditions.

The teachers' survey showed that most teachers were not comfortable with their present level of competency concerning computer-assisted instruction, yet the principal had promoted the use of computers as an instructional tool to improve students' basic skills.

The second and fourth grade students who failed to master 4 or more skills in mathematics and/or writing on a sample form of the SSAT became the target group for the implementation of this practicum. The rationale for selecting this grade was that instruction in both grades affect the achievement on the SSAT administered in the following grades.

Student data revealed a decrease in SSAT scores in mathematics and writing which lowered the overall achievement level of the school. The second and fourth grade students were chosen for curriculum emphasis because the skills measured on the SSAT reflect instruction in this grade. For those students who

failed to master at least 7 skills on the Sample SSAT, additional drill and practice utilizing computer-assisted instruction ensured skill mastery.

This project sought to solve the problem of the decrease in SSAT scores in mathematics and writing. Approximately 450 students in the second and fourth grades were pretested, and curriculum focus was concentrated on those students who missed 4 or more basic skills in mathematics and writing. The actual number of students in the target group was determined by the pretest results.

Outcome Objectives

Over a ten week period, 80 percent of the students identified by the pretest missing seven or more skills in mathematics were to improve their mathematics skills by the mastery of a total of 5 skills as measured by the difference between skill mastery scores on the Sample State Assessment Test to be administered before and after the implementation of the practicum.

Over a period of ten weeks, 80 percent of the sixteen teachers of the students in the target group

were to increase their knowledge of the computer as measured by increasing by 3 or more the number of items answered correctly on a writer-composed survey administered before and after the implementation of the computer training of the second and fourth grade teachers.

Over a ten week period, 80 percent of the sixteen teachers of the students in the target group were to increase their understanding of computer-assisted instruction as measured by increasing by 3 or more the positive responses to a survey composed by the writer administered before and after the implementation of the training in computer-assisted instruction.

CHAPTER II

Research and Solution Strategy

Slavin (1988) contended that cooperative learning may be a solution to many educational problems. While providing a means toward higher achievement and a more positive self image, cooperative learning may serve as an alternative to ability grouping, a means of introducing higher level skills into the curriculum, and a means of ensuring students an adequate level of basic skills. It may also provide the student with the means to develop the collaborative skills necessary in a increasingly interdependent society.

According to Slavin, two conditions must exist before the achievement effects of cooperative learning will be attained. There must be a group goal which is important to all members of the group. The success of the group as a whole must be structured to depend upon the individual learning of all group members. In the presence of both conditions, cooperative learning has

many positive effects on the students. It fosters self esteem, intergroup relations, and individual accountability.

Mathur and Prakash (1988) reintroduced the concept of the individually guided system of instruction. The curriculum is divided into units which are introduced by the teacher. Utilizing a study guide, the student learns the new skills on his own. A mastery test is administered on a predetermined date or when the student requests it. The learning strategy promotes student initiative in the self-learning activity and may be appropriate in educational environments which emphasize individualized learning.

Fromberg and Driscoll (1985) contended that educators often neglect the student's need to feel effective or competent while emphasizing the student's product or measurable achievement. Self-concept is defined by the authors as self-knowledge. It is knowledge that is open to influence by others. The authors explained that as the self-knowledge grows, the self-concept is verified, and the students becomes less dependent upon others for information about themselves. As the students become involved in curriculum content

with concrete, meaningful activities, they are less likely to exhibit disruptive behavior, and disciplined behavior is created.

Fromberg and Driscoll (1985) believed that most children are stimulated when they spend time collaborating with another child in an activity. Peer teaching is an activity which provides opportunities for both student and peer teacher to enhance their self-concepts. Children are socially aware of one another and anxious to impress each other with their own competence.

The scope of the activities, the authors continued, vary depending upon the capabilities of the peer teacher and the student. Both participants should learn from the experience. The peer teacher should provide supplemental experiences and encourage the student.

Fifteen years ago, students were learning computer language. Today students are using computer technology to enhance the curriculum in all areas (Merriman, 1987; Fisher,1986; Eiser, 1987; Helms, 1987) also believe that the computer movement has entered a new phase of its development. Rather than concentrating on the

technology of computers and computer literacy, teachers are discovering computers as tools for curriculum implementation. The movement has been to computer application in curriculum. Teachers are a major component to the transition from computer literacy to computer-assisted instruction.

According to Vernot (1987) students need a teacher who believes in the value of computers. Valuable education occurs when a student is allowed to explore a piece of software, learn the operation and train the teacher. In a study of teachers' attitudes toward educational computing, Reed concluded that how successful the computer is in education depends on how valuable the teacher perceives it to be. According to Hoelscher (1986), attitudes also include the interest of personnel in preparing students for life in the information age.

Helms (1987) believed that technological changes as a challenge rather than as a crisis can seize the opportunities to use new technologies to help students explore their individual potential in making connections with information in new ways. He also felt that technology can be useful in teaching children the

basic skills they will need for life in the next century.

Along with teacher attitudes toward computer-assisted instruction, the teacher's use of computers affect the instructional program. The most valuable computer uses, according to Reed's study (1986) were to provide instruction on computer literacy and awareness followed closely by assisting the teacher with managing instruction and providing drill and practice. His study concurred with many others (Eiser, 1987; Helms, 1987; Hertzke, 1987; Vernot, 1987; Wolf and Walthers, 1986) that spreadsheets for problem-solving exercises, data bases for students' records, and software for keeping and averaging grades were important to teachers.

Gregg Keizer (1988) had a different approach to computer use by teachers. He believed that school computers should be placed on teachers' desks where they would do the most good. He stated that computers can't teach, but are rather simply tools of the trade. He did admit that drill-and-practice software can do wonders for some children. He felt that the computer brings order to chaos by storing information as well as

simplifying manipulation or retrieval of information.

Keizer declared that computers should be used mainly for tasks such as tracking attendance, note taking, scheduling lessons. Teachers should be able to view cumulative records on the screen and communicate among subject areas in the same school in order to trace and head off potential difficulties. By organizing the teachers and managing the required paperwork, more time can be spent doing what teachers do best, teaching, and thus make them more productive.

Several authors provided plans for computer-assisted instruction. Hertzke's (1987) implementation plan called for students to spend 25 minutes on alternate days in the computer lab in a highly individualized, self-paced basic skills instruction. It reduces the teacher-student ratio and effectively tracks student progress, rate of success, and level of achievement. In order to make the most efficient use of a computer with 35 students in a 40 minute period, Vernot (1987) advised using the computer with large group demonstrations and interactions. Some software is designed to be effective in front of the whole class. To address the issue of individual access

while keeping the computer from distracting the rest of the class, he suggested turning off the sound.

One school established a center featuring 6 stations adapted to different learning tasks, such as general curriculum, science, and social studies. The classes were rotated through the stations at least once every ten days for computer-assisted instruction. Students were able to schedule themselves for review sessions during lunch periods and after school (Cicchelli, 1987).

All authors agreed that computers do motivate students. "In just a few short years, we've seen how computers can motivate and excite students... We've also seen the same excitement generated in our teaching staff" (Merriman, 1987:8). Vernot agreed that the computer boosts student motivation and comprehension, but also adds affective goals, group processes, and critical thinking skills in order to tackle reasoning. He concluded that the computer is a tool to aid the teacher in providing students with experiences and information. "A word processor and printer have been known to fire up even the most reluctant writer" and thus make learning easier for both students and

teachers (Vernot, 1987:18).

Joyce et al cited Benjamin Bloom's (1984) analysis of the effects of technology on students' learning. Bloom concluded from the studies he reported that all students can learn more using technology than they presently learn under normal learning conditions. He also stated that the least promising students can master curriculum with the assistance of technology. "Seventy-five percent of the students reached a level of mastery attained by only 20 percent of the students in the conventional classrooms." (Joyce et al, 1987:14)

Hertzke (1987) stated that when each student works in a computer lab on his own computer with a headset and microphone, he can work without distraction. He noted that teachers found that students were able to concentrate more effectively on their work, and this carried over to the regular classroom. It also improved problem-solving skills by emphasizing thinking skills and step-by-step approaches to problem solving.

Fromberg and Driscoll (1985) extended the concept further by pointing out that when students have control by influencing choices and directing the sequence of events, they are more willing to remain on task.

Bryant et al, (1987) continued the concept by stating that the students quickly learn how to control technology and how to get the proper response. They also develop the ability to use logic and mechanical skills which are not tapped when listening or writing on paper. Through computer usage, they learn collaboration and communication which are major objectives of education.

A component of computer effectiveness in an instructional setting is good teacher training and continued staff development. In an extremely humorous way, Thomas Gandy (1987) illustrated what most already know- many teachers, especially veterans, have an inherent fear of and awkwardness around computers. They were led to believe that computers were touchy undependable, incomprehensible machines that made errors and had monstrous "1984"ish implications for society. He admitted that reducing the fears of intimidated teachers is no easy task.

Several authors contended that training helps the staff members overcome their fears of technology, and that adequate training has been a challenge. Merriman (1987) took administrative responsibility by

pronouncing that the job of administration is to help staff members realize that computers will enable them to do their jobs easier, faster, and in many cases better. He stated that "Whether they're using computers as a classroom tool, for recording grades, or for scheduling substitutes, we have to help staff members see the benefits and be comfortable with the equipment," (Merriman, 1987:9). If teachers do not have this help, they must convince their administrators to provide time, training, and access to information about good software and how it relates to the curriculum. Trying to actually use a computer in curriculum on a daily basis requires lots of assistance (Fisher,1986).

Helms (1987) provided a solution by suggesting that analyzing the scope, sequence, and content of the curriculum helps on to maximize the use of new technology. Sample lesson plans enable the teacher in training sessions to see how changes in technique could occur and how changes in student learning could be improved. They can reinforce basic skills, motivate learning and increase time spent on curriculum-assisted instruction. The teacher will easily see that the

program and the lesson plans will never replace the teacher, but can provide an individualized lesson and free the teacher from having to reteach a lesson to a student who was absent or needs remedial help.

To counteract professional staff reluctance in one district, the superintendent and school board established curriculum-assisted goals and provided resources for a major staff development program to train teachers in curriculum specific computer use. Every elementary school teacher received ten hours of mandatory teacher-led training during school time and at district expense. The teachers returned to their classrooms and immediately began to utilize their skills. There was little downtime between training and classroom application. As the students' positive responses became more overt and noticeable, impetus for program expansion shifted to teachers and parents. The program began to sell itself (Cicchelli, 1987).

Joyce et al (1984) listed highlights of research on staff development gleaned from nearly 200 research studies and a review of the literature of staff development. Teachers bring knowledge and skills, their individual learning and teaching styles, and

personal characteristics to staff development. Teachers also bring perceptions about their needs and preferences for specific kinds of staff development.

Joyce et al also stated that most teachers can take useful information back to their classrooms when training includes four components: presentation of theory; demonstration of the new strategy; initial practice at the training session; and timely feedback concerning their efforts. The authors continued the thought by stating that if coaching-either expert or peer- is received while the teachers are attempting the new strategies in their classrooms,they are more likely to maintain and utilize them.

The literature seemed to support the idea that a basic level of knowledge in a new approach is necessary before teachers can "buy into it". Showers et al cited the opinions of Miles and Huberman (1987) who state that "commitment follows competence, rather than preceding it. Without extensive training, persons do not have sufficient knowledge or experience to 'buy in.' Once they develop a skill and learn to use it, they reach a position where they can make a decision." (Showers, 1987:82).

The Office of Technology Assessment (OTA) report "New Technologies are Making a Difference" (1988) produced one major theme. Technology is changing schools and is having a positive effect on both teachers and students. Educators and students can use computers as a tool to stimulate imagination, develop critical thinking skills, track students' progress, simulate live experiments, encourage group projects, and foster school/home ties.

The OTA report made several observations. Only 3 states require inservice training in technology programs. Thirteen states recommend inservice training, and the remainder of the states have neither requirements nor recommendations concerning inservice training in this area. The report concludes that state efforts toward teacher training are a weak link in the effective and widespread use of educational technology. The report also states that education school faculties and student teachers felt that the training of new teachers was not as adequate in computer-assisted instruction as in other areas. These factors might reflect the fact that, although computers can be found in almost all public schools, only half of the nation's

teachers ever use them. A smaller number report using them regularly.

The OTA report states that recent data indicate that only one-third of all K-12 teachers have had as much as 10 hours of computer training with much of the training focused on computer operation rather than computer-assisted instruction. Creative approaches to teaching traditional subjects are made possible by the new technologies. The greatest impact of computers has been on teaching style since teachers can serve as facilitators of student learning, rather than as presenters of information. Computers can only enhance and enrich teaching when 4 conditions exist: adequate teacher training in the skills needed to operate the technology; a clear vision and understanding among educators of state-of-the-art developments and applications; support for experimentation and innovation; and time for learning and practice.(40) The report concludes that teachers will need inservice programs on a continuous basis as technologies change, as more effective uses are developed, and as research provides a better understanding of the learning process.

Solution Strategies

Possible external strategies were considered. The construction of a new elementary school facility was planned for the future. The anticipated time frame for the completion of the facility was 18 months. Although the new school would initially reduce the student population, the present as well as the anticipated development of areas west of the practicum site will provide the children which will increase the student population over the 100 percent facility capacity once again.

Additions to the permanent school facility were also considered. A new wing has been included in the school system's 5 year plan of capital improvements; however, it has been assigned for the fifth year of the plan which will not solve the present overcrowded conditions. Eight additional portables should be on site by the conclusion of the 1988-1989 school year. The overcrowded conditions will remain in the intermediate grades since these portables have been administratively assigned to the primary grades to

bring class size into compliance with the state's mandate.

A change of the school's attendance boundaries was considered at great length. Attendance boundaries were adjusted to the east of the practicum site to accommodate students attending the new elementary school. The student populations of all the schools in the immediate area were studied to determine if boundary adjustments could be made to alleviate the overcrowded conditions. Since all of the schools were at 100 percent capacity or above, an adjustment of attendance boundaries would not be a viable solution.

Possible internal solution strategies were considered. The introduction of alternative learning strategies might include several components for optimum effectiveness. The classroom activities should motivate students to learn, include cooperative learning strategies, and contain a component for individualized learning.

One learning strategy would be to introduce peer teaching. This solution was limited in application due to overcrowded conditions. There was no area within the practicum site that was not being utilized during

the school day to accommodate the students. The pod areas were so overcrowded that no quiet spot can be found. Because of the excessive student population access to the library was limited. Several special classes were already being conducted in the cafeteria when lunch was not being served. Only a small number of students could have been serviced under optimum conditions.

Another learning strategy to be considered was computer-assisted instruction (CAI). It would incorporate a response to the individual needs of the student population, an individually guided system of instruction, and provide opportunities for cooperative learning as small groups of students work on the computer. A search of the literature indicated that students are motivated to learn using computers. The use of computers provides the student with experiences and information while providing the teacher with management tools. By utilizing earphones, some noise distractions can be eliminated in the classroom setting.

The use of computers to assist instruction to reteach and reinforce the skills assessed on the SSAT

and the SAT would free the second and third grade teachers to continue with the objectives required for their grade levels while addressing students needs. The concerns of the teachers which emerged from the teachers' survey would also be addressed. Frustration had been expressed concerning large class size , the overcrowded conditions, and the need for more individualized and small group instruction. Pulling out those students from the classrooms who need additional instruction to aid them in skill mastery and providing the necessary instruction would relieve some of these concerns.

The writer also believed that it would begin to address one cause of the high noise level in the pod areas. Students who are frustrated or are not functioning at the same levels as the majority of the members of the class will be easily distracted or avoid the classwork by utilizing other behaviors such as talking. By providing these students with instructional materials which will produce positive feedback, the extraneous talking would be reduced.

By adapting Hertzke's implementation plan to the practicum site, the existing computer laboratory

schedule could be utilized to accommodate the target group. Each group would enter the computer laboratory at the scheduled time. They would be grouped according to individual weaknesses as measured by the pretest of the Sample State Assessment Test. The appropriate software would be distributed to each group.

The search of the literature also indicated that the effectiveness of computer-assisted instruction depends on good teacher training and continued staff development. The literature supported the concept that a basic level of knowledge is necessary before teachers will utilize the strategy in their classrooms. Surveys indicated that only one-third of all K-12 teachers have had as much as 10 hours of computer training. The training has been focused on computer operation rather than computer-assisted instruction. Therefore, inservice training sessions concentrating on both computer literacy and computer-assisted instruction would be additional internal strategies were incorporated into the solution strategies.

The strategy was to implement a computer-assisted instructional program in writing and mathematics for students and to conduct inservice training sessions on

curriculum-assisted instruction for the second and fourth grade teachers. A group process approach utilizing a school-based computer committee would be a vehicle for implementation.

CHAPTER III

Methodology

The staff development, administrative/supervisory, and student/classroom activities were conducted concurrently. In the beginning of the first week of implementation, the administrative/supervisory activities began with separate meetings conducted by the writer with the administrative team and the grade level chairpersons. The practicum site had quite recently experienced a change in administration. The newly-arrived principal as well as the two assistant principals were given executive summaries of the plan and were made aware of the objectives of the practicum. Available resources and scheduling options were discussed. Feedback was encouraged by the writer in order to foster support for the project. As a result of this meeting, permission was granted by the team to order any necessary materials, and the decision was made to incorporate the computer committee into the

curriculum committee of the school-based management plan.

At the meeting with the grade level chairpersons, the practicum plan was accepted as the school site's plan for SSAT and SAT remediation to be placed in the administrative area office as well as the district's department of education. A tentative plan for pretesting the students was presented by the writer. At the conclusion of the meeting, a modified schedule was approved and instructional aides were committed by the second, third, fourth, and fifth grade chairpersons to chart the results of the pretest.

On the following day, separate meetings were held with the compensatory education teacher and the second and fourth grade teachers. It was determined that 5 additional computers could be utilized by the classroom teachers for the students in the target group on Mondays, Wednesdays, and Fridays. This schedule was duplicated and disseminated at the meeting with the second and fourth grade teachers.

The writer provided each second and fourth grade teacher with a copy of the Sample Student State Assessment Test and discussed the administration of the

instrument. It was decided that the student profile sheets (Appendix G) which are provided with the measure would be used to chart the student mastery of skills. The students would be tested by their homeroom teachers in 3 consecutive morning sessions. The student test booklets were given to each teacher. Since there were only 75 test booklets for each grade level, there were not enough booklets to test each class at the same time; therefore, a modified schedule was developed. The 4 teachers in each pod area would complete their testing by Wednesday of that week and send the booklets to the teachers in the portables by Wednesday afternoon.

On the last day of the first week of implementation, the writer instructed the classroom aides in the procedure for scoring the pretest. The aides developed an answer sheet which would facilitate the scoring. The student answer sheets were copied and provided to each teacher by the instructional aide.

During the first week of implementation, the writer and the computer laboratory aide previewed the available software and determined which software program would be appropriate for each skill measured on

the Sample Student Assessment Test. The decision was made to order 28 additional software programs. The writer completed the appropriate purchase order, obtained the proper signatures, and went to the computer education department to obtain the required programs.

During the second week of implementation, the writer supervised the administration of the instrument by ten second grade teacher and six of the fourth grade teachers to 358 of their homeroom students who were not assigned to either compensatory education or the exceptional education program. The instructional aides scored and charted each student designating which skills were mastered or failed.

The pretest administration took 3 weeks to accomplish due to complications. The scheduled daily sessions were not long enough to complete each section. Since there were not enough booklets for each class, one class had to wait until the other had finished in order to receive the booklets.

The schedule of homeroom classes taking the test could not be altered because all homerooms meet at the same period of the day. Three teachers were absent due

to illness for 3 to 5 days over this period. One was hospitalized for 7 days. One teacher transferred to the first grade and was replaced by a substitute teacher. The members of the administrative team concluded that they were not comfortable using a substitute teacher to administer the pretest. Another teacher was absent from the classroom on special assignment. The instructional aides were overwhelmed by the charting due to the number of students as well as the unanticipated number of failed skills.

After the completion of the test administration of each homeroom class, the writer totaled the failed skills for each student as well as the number of students failing each skill. One hundred and sixty-seven students qualified for the target group as measured by 4 or more failed skills. The completed homeroom profile sheets were distributed to each teacher.

The writer conducted a meeting with the administrative team, the second and fourth grade teachers, and the computer aide on the first day of the fourth week of implementation. The group decided to redefine the target population from 4 to 7 failed

skills and to postpone scheduling the second grade students into the computer laboratory until after the conclusion of the practicum in order to accommodate the large number of students. The committee also determined that the target group would receive at least two 30 minute sessions per week in the computer laboratory along with classroom instruction.

The skills requiring remediation were grouped according to like mathematical concepts, and the appropriate software program was designated for each skill. All software programs were products of the Minnesota Educational Computer Consortium (MECC) and were inexpensive to purchase.

"Money Works" was selected for those students who had not mastered the skills of making change from one dollar after the purchase of 3 items, identifying amounts of money less than or equal to $5.00 in coins and currency, and reading and writing money values through $5.00. "Circus Math" and "Addition Logician" were picked for the skills concerned with the addition of 1, 2, 3,or 4 digit numbers with and without regrouping. "Subtraction Puzzles" was chosen for those skills dealing with the subtraction of two 2,3,or 4

digit numbers with or without regrouping.

"Number Munchers", "Multiplication Puzzles", and "Quotient Quest" were selected to be utilized with those students failing to master multiplication facts through 81. "Clock Works" was chosen to remediate the skills denoting telling time to the hour, half hour, quarter hour, and minutes (Appendix I).

A schedule for the computer laboratory was established providing the computer aide and the homeroom teacher with an explanation of the skill to be mastered on each date, a class list consisting of each child who had failed to master that particular skill and homeroom teacher, and the computer program to be used on that date. Meanwhile the computer aide found a student profile sheet which would be completed after each session to monitor skill mastery in the laboratory setting (Appendix H).

The writer chose to utilize the entire program rather than specific selections on the menu because the students could use the review of easier skills to aid skill mastery and to develop student motivation as success is achieved playing the easier games. The students would then be motivated to attempt the more

difficult skills within the program which they had not mastered.

At a brief meeting held the next day with the fourth grade teachers, the administrative team, and the computer aide, it was decided that the classroom teachers would develop home study packets for each student requiring remediation in counting; rounding whole numbers less than 100 to the nearest ten; stating months of the year; using a calendar; and word problems. The group concluded that these skills would require more teacher-generated lessons than the other skills and wished to maintain more control and direct feedback of students' progress. As a result of this meeting, the writer established a skills bank with appropriate activities for each skill and placed the folders of the bank in the fourth grade workroom.

During the fourth through the ninth weeks of the implementation, the writer monitored at least one session of each group and informally interviewed the students. Meetings with the computer aide were held at the end of every week to evaluate the progress and make any changes that were deemed necessary. During the tenth week, the writer monitored the posttest

administration. During the first week of implementation

During the first week of implementation the writer placed a sign-up sheet for the Teacher Education Center (TEC) course in computer-assisted instruction on the teachers' sign-in bulletin board in order to initiate staff development activities. By the middle of week two, the signatures of the required 12 interested teachers were obtained.

Only 4 of the teachers on the list were fourth grade teachers. The writer met with all fourth grade teachers early in the second week of implementation and concluded that more teachers were interested; however, due to the demands placed on them by the school's new school-based management status, these teachers requested that we postpone the training until the 1989-1990 school year.

The list of interested teachers was presented to the media specialist/ TEC representative with a request to expedite the scheduling of the class. Due to scheduling difficulties at TEC the requested inservice training of teachers in computer-assisted instruction could not be conducted until after the completion of the ten week implementation.

During the second week of implementation, the administrative team met to determine how to train the second and fourth grade teachers on computer-assisted instruction without a structured TEC class. It was decided that those teachers who were interested would be trained during free times during the school day at the convenience of all concerned. The informal training would consist of reviewing the available software and strategies to coordinate the classroom computers with daily lessons and take place the following week. The computer laboratory aide would conduct the training. Teacher check-out policies and procedures for software were established with the computer aide. During the third week of implementation, the informal training of 3 fourth grade teachers took place.

The student/classroom activities began with the administration of the pretest. Due to the extended period of time required to administer the test, the unexpected time required to prepare the student profiles, and the necessity to revise the target group as a result of the large number of students, those students who failed to master 7 or more skills began implementation in the computer laboratory and the

classroom during the fourth week of implementation of the practicum. The students in the target group received at least two 30 minute sessions per week in the computer laboratory for a period of six weeks. The writer monitored at least one session of each group of students each week. The students were asked if they felt that the lesson had helped them and if they understood the concept that had been the focus of the session. They were also asked to evaluate the software as to clarity, comprehension of directions and subject matter,and whether or not the session had helped them. During the tenth week of implementation, the fourth grade students were given the posttest.

CHAPTER IV

Results

Over a ten week period 80 percent of the students identified by the pretest missing 4 or more skills in mathematics and writing did not improve their mathematics and writing skills by the mastery of a total of 3 skills as measured by the difference between skill mastery scores on the Sample State Assessment Test administered before and after the implementation of computer-assisted instruction. Of the 358 second and fourth grade students who took the mathematics and writing sections of the Sample State Assessment Test, 167 students failed to master 4 or more skills. Due to the unexpectedly large number of students failing to master the skills and having only 14 computers available for use, the objective was impossible to achieve as stated.

In order to accommodate the students requiring skills remediation, the objective was redefined. The

second grade students were eliminated from the practicum implementation due to time constraints although they were accommodated during the last nine-week grading period of the school year.

The target group was redefined to include those students who failed to master 7 or more skills in the mathematics section of the Sample State Assessment Test, and success would be measured by 80 percent of the students mastering 5 or more skills as measured by the difference between skill mastery scores on the Sample State Assessment Test administered before and after the implementation of computer-assisted instruction. Therefore, the writing section of the objective was never attempted.

Twenty-eight fourth grade students qualified for the target group. After 6 weeks of computer-assisted instruction conducted in fifteen 30-minute sessions, only 11 students or 46 percent mastered a total of 5 or more skills. Four students or 17 percent actually failed to master more skills on the posttest and 2 students or 8 percent remained the same. Nine students or 38 percent failed to master skills on the posttest that they had mastered on the pretest (Appendix K).

Table 3

A Comparison of Pretest and Posttest Scores by Student

Student	Pretest	Posttest	Difference
1	8	3	+5
2	8	4	+4
3	7	4	+3
4	7	9	-2
5	11	4	+7
6	8	4	+4
7	7	2	+5
8	9	4	+5
9	7	2	+5
10	11	4	+7
11	7	2	+5
12	7	5	+2
13	9	0	+9
14	9	10	-1
15	8	7	+1
16	9	11	-2
17	9	9	0
18	7	7	0
19	7	2	+5
20	7	4	+3
21	9	3	+6
22	7	3	+4
23	7	8	-1
24	7	2	+5

Although the objective of 80 percent student mastery of 5 or more skills was not achieved, the implementation of computer-assisted did produce some positive results. Seven skills were successfully remediated.

Table 4

A Comparison of Pretest and Posttest Scores by Skills

Skill	Pretest	Posttest	Difference
A 7	8	0	+8
E 39	6	1	+5
E 40	5	3	+2
E 41	20	14	+6
F 42	17	7	+10
F 47	18	6	+12
F 48	17	11	+6
F 49	11	8	+3
F 50	18	15	+3
G 53	6	4	+2
G 54	16	9	+7
M 87	9	6	+3
S 125	11	7	+4
S 126	24	22	+2

The computer-assisted instruction appears to perform well with such skills as: reading and writing numbers, addition and subtraction of 1, 2, 3, or 4-digit numbers, and multiplication.

When the writer compared the results of the posttest with the computer chart maintained by the computer aide, it was discovered that some students achieved mastery in the computer laboratory but did not transfer the knowledge to the posttest. Of the 3 students who did not master addition of 1,2,or 3-digit numbers with a 3-digit number with no regrouping (E40),

100 percent or all 3 students had mastered the skill in the computer laboratory by 80 percent mastery of the problems. Of the 4 students who failed to master the multiplication facts (G53) on the posttest, 1 student achieved 100 percent mastery in the computer laboratory; one student achieved 97 percent, and 1 student mastered 85 percent of the problems.

Twenty-four students failed the skill of identifying change from $1.00 after a purchase of 3 items (S 126)on the pretest. Five students did not attend the computer session. Two students passed the skill on the posttest. Of the remaining 17 students, 9 achieved 90 percent mastery of the problems, and 4 achieved 70 percent mastery in the computer laboratory. The writer concluded that this skill was not provided with enough time in the computer laboratory to successfully remediate the students.

When the expected outcome was not realized, the writer conducted another informal interview with the teachers, students, and computer aide. Of the 12 students interviewed, all of them felt that the computer-assisted instruction was beneficial to them. Five felt that it helped them on the posttest and made

the test "easier." When asked why they felt it was beneficial, the students concurred that the practice was "fun", and they could concentrate better on the computer than in the pod area.

The teachers were asked if they felt that the computer-assisted instruction had been beneficial to their students. Of the 6 teachers interviewed, 2 teachers responded that the computer-assisted instruction had been very beneficial. Three teachers stated that they weren't really sure, and 1 teacher didn't know but felt it was a better program than had been developed previously for the computer laboratory. When asked if they had utilized the computers in the classroom areas, they stated that they had not utilized them as much as they should have. They stated that there were not enough computers available to them nor enough computer time. They also reported that the profile sheets were difficult to read since they were set up by homerooms instead of mathematics classes.

There may be several factors which contributed to the failure to achieve the objective. Carelessness on the part of the students and test phobia may have played some part. Frequent absences from the computer

sessions could have been a factor. Two students did not attend the sessions at all, and only 2 students attended all 15 sessions. The computer aide complained that often she had to go to the classes and get the children because teachers had forgotten to send them. There were several school functions occurring during the implementation which caused the students to miss computer sessions. The music, physical education, and Spanish programs had to practice for presentations and pulled the students out of classes.

Another factor which might have affected the implementation outcome was the duration of the computer-assisted instruction. The pretesting took 3 weeks to accomplish which was not anticipated in the implementation plan. That left only 6 weeks 18 possible sessions in the computer laboratory. Three sessions were eliminated due to fourth grade field trips. This writer has concluded that the duration of the curriculum implementation was not sufficient to affect change.

The teachers stated that they did not follow through with the classroom computers or the home packets. They explained that they did not have time to

compile the packets even though the activities bank was available to them. The writer should have monitored the commitment made by the teachers and utilized the curriculum aides to compile the packets.

The teachers and the computer aide stated that the students did not appear to take the posttest seriously. The test administration was conducted on an unstructured time basis. The students were allowed to complete the test at their own paces. The test administrators also stated that the students seemed to be easily distracted. The writer noted these behaviors during the test administration and provided time restrictions in order to accomplish task completion. The testing situation was not the optimum. The 28 students were tested in the pod area with 4 teachers conducting classes at the same time, therefore creating an artificial testing environment not conducive to concentration.

The scheduling of the posttest administration was particularly poor. The administration of the posttest was begun one day prior to the annual Stanford Achievement Test administration. During the 4 days of Stanford Achievement testing in morning sessions, the

students were subjected to additional posttesting in the afternoons in order to remain on the implementation schedule.

The quality of the available software could also have been a factor. Since MECC software was easily accessible and inexpensive, it was utilized in the implementation of the computer-assisted instruction. A thorough search of software could have provided more appropriate programs to address the skills on the State Assessment Test.

Another possible factor in the failure to achieve the objective could be the lack of coordination of classroom instruction and computer-assisted instruction. Neither the fourth grade classroom teachers nor the computer aide provided prior instruction of the skills presented at each session. There was also no follow up activities in either the classroom or the computer laboratory.

The assumption that skills mastery for all students could be accomplished through computer-assisted instruction could also have been a factor in the failure to achieve the objective. Learning styles of individual students and long term

retention strategies were not considered nor were the factors which make computer-assisted instruction effective.

The objective to train the sixteen teachers of students in the target group in computer literacy was not achieved. Two major factors contributed to the failure to meet the objective. After the proper procedure was followed for application to the TEC, the TEC informed the writer that due to scheduling difficulties, no instructor would be available until after the practicum completion date. The principal of the practicum was transferred one week prior to the implementation of the practicum. The school environment was totally affected by the unexpected change in leadership.

Within the same time frame, the practicum site was approved to enter the school-based management/shared decision making program of the local school district for the school year 1989-1990. The new principal upon his arrival chose to use the remaining school year to practice the school-based management/shared decision making strategies with the school community in order to prepare for the upcoming school year. The formation of

the steering committee, the 4 standing subcommittees, and various ad hoc committees created new demands on the teachers.

Unexpected changes in the fourth grade also contributed to the failure to meet the objective. Three of the 6 fourth grade teachers were directly affected by the decision to begin school-based management during the current school year. Their additional responsibilities demanded a considerable amount of their time. They were not willing to spend any additional time on new projects. Two of the teachers were replaced by long-term substitutes who may or may not return to the school in the 1989-1990 school year. They did not wish to participate in the training. These factors may explain why the decision was made in the second week of implementation to postpone the training until the 1989-1990 school year.

The fourth grade teachers were provided two 30-minute training sessions concerning computer-assisted instruction. Three teachers attended. They were provided with the same software which were being used with the students. A thorough discussion of each program was conducted. At the

conclusion of these sessions, two questions were asked of each participant. All 3 teachers responded that they felt the training was useful and that they would use the programs in conjunction with their classroom mathematics curriculum.

Although the objectives of the practicum were not met, there were several positive changes. The fourth grade teachers became aware of the particular skills which needed special attention in order to achieve mastery, and the individual students who needed additional help on specific skills. They were also made aware of the various possibilities of using computers to assist their instruction through training and example. The writer developed a curriculum plan which was incorporated into the daily plan to include computer-assisted instruction. The fourth grade teachers were encouraged to observe previous students at work on the computers and compare their progress. Students who had not mastered multiplication and division facts were achieving mastery.

It is the conclusion of this writer that computer-assisted instruction is not an effective strategy to remediate some mathematics skills. The

utilization of appropriate software matched to the appropriate learning styles of the students may be one strategy to motivate some students and provide the drill and practice required by others. The initial teacher-directed instruction and teacher knowledge of the needs of each student are mandatory to the success of computer-assisted instruction.

CHAPTER V

Recommendations

Although the practicum objectives were not achieved, the writer believes that the project had merit and should be modified. The utilization of computer-assisted instruction to achieve skills mastery on the State Assessment Test should be integrated into classroom instructional activities. Instead of a singular strategy, it should be one of several teaching strategies used by the classroom teachers to meet individual learning needs.

Future assessment of computer-assisted instruction and its utilization toward skills mastery should be conducted. Additional research focused on the possible utilizations of the computer laboratory should be conducted in depth. Research should also include such topics as: the type of child who best benefits from computer-assisted instruction, the duration of the computer-assisted instruction necessary for skills

mastery, the appropriate software, and the factors which make computer-assisted instruction work.

This practicum should not be attempted on a large school site. A small or average sized elementary school or one which contains 3 or 4 classes per grade level is preferable to one with 6 to 10 teachers per grade level. Dealing with a small number of teachers provides a better opportunity to plan a more appropriate program. Scheduling of computer sessions, providing more sessions, and monitoring would be facilitated by working with a small group. The number of students to be served would also be smaller than in a large school. Students could receive more individual attention, and individual programs could be developed to meet the students' needs. Had this practicum been conducted in an average size school, the 14 available computers might have been sufficient.

Software which have been developed to address skills mastery on the Student State Assessment Test should be purchased prior to the implementation of the practicum. The writer researched the subject and found that there were several programs which can be purchased for about $2,000 which includes the site licence. The

licence would enable the computer laboratory as well as the classroom teachers to obtain software geared specifically to drill and practice as well as remediation of the specific skills requiring mastery. After use in the second and fourth grades, the third and fifth grade teachers could utilize the programs for general class review prior to the SSAT administration in October as well as individual remediation prior to and after the test.

By providing the third and fifth grade teachers with the student profile from the previous year, the teachers could develop the proper classroom instructional activities needed to produce skills mastery. The student profiles identify specific weakness throughout the grade by simply totally the number of students failing to master a particular skill. The classroom teachers can plan to emphasize these skills at the opening of school. By observing the failed skills for individual students, the teacher can determine which skills need drill and practice and remediation for each student. Teaching strategies can then be developed rather quickly to promote skills mastery.

The pre and posttest administration of the program should be modified. Students should be tested by subject rather than by the homeroom teachers. This would enable the teacher of a mathematics group to obtain a complete picture of the strengths and weaknesses of the class. Students groupings for computer-assisted classroom activities would be facilitated.

The student activities concerning computer-assisted instruction for skill mastery on the SSAT should commence at the beginning of the school year. That would allow enough time to address each skill in the depth necessary for each child. One curriculum plan for the computer laboratory could reserve the entire second grading period for SSAT mastery for second and fourth grade students, and the third grading period could be devoted to skills mastery for the third and fifth grade students requiring remediation.

The TEC training for computer literacy should be scheduled for October or November when the teachers feel less job-related tension than later in the school year. By requesting training for the fall in May of

the previous school, the TEC could assign the classes at the convenience of the teachers, thus possibly increasing voluntary participation.

The computer-assisted training should also be scheduled in mid year to coordinate with the computer literacy. The teachers should be encouraged to participate by being provided with the experiences of their peers who are already utilizing computer-assisted instruction. A staff meeting focusing on sharing teaching strategies might be a good vehicle for such encouragement.

If all three components are integrated into a computer-assisted approach to curriculum, skills mastery may become more achievable without tension and boredom. Many unnecessary hours would be saved by both teachers and students as they utilize the computer to assist instruction and learning.

REFERENCES

Bryant, Karen, Bob Speilvogel, and Kay Gore. "Is Technology Really Helping Anyone?" Instructor Special Hi-Tech Issue. Fall, 1987, pp. 18-20.

Cicchelli,Jerry. "Resolute Leadership Erases Resistance to Technology." Electronic School. July, 1987, pp. 11-13.

Eiser, Leslie. "Help, I'm Drowning in Paperwork." Classroom Computer Learning. February, 1987, pp. 26-29.

Fisher, Glen. "Is the Computer Movement Dead?" Instructor. May, 1986, p.27.

Fromberg, Doris Pronin and Maryanne Driscoll. The Successful Classroom. Teachers College, Columbia University. New York; 1985.

Gandy, Thomas. " The Inservice Workshop: When You're Responsible for Introducing Other Teachers to the Mysteries of Micros." Classroom Computer Learning. May, 1987, pp. 27-31.

Helms, Donald. "Commitment to Technologies Multiplies Curriculum Power." Electronic School. July, 1987, pp. 5-7.

Hertzke, Eugene R. "This Computer Network Turns A Management Nightmare Into A Teacher's Dream." Electronic School. July, 1987, pp.19-20.

Hoelscher, Karen. "Computing and Information: Steering Studies Learning." Computers in the Schools, Winter, 1986, pp.23-37.

Joyce, Bruce, Beverly Showers, and Carol Rolheiser-Bennett. "Staff Development and Student Learning: A Synthesis of Research on Models of Teaching." Educational Leadership. October, 1987, pp.11-23.

Keizer,Gregg."Editorial License." Compute! October, 1988, p.4.

Mathur, Rajeshwar N. and Brahm Prakash. "Individually Guided System of Instruction: A Cooperative Learning Strategy." Educational Technology. February, 1988, pp. 45-47.

Merriman, Howard. " Computers and Robotics Roll Back Frontiers of Learning." Electronic School. July, 1987, pp.8-11.

"OTA Report: New Technologies Are Making a Difference." Classroom Computer Learning. October, 1988. pp. 33-42.

Reed, Michael. "Teachers' Attitudes Toward Educational Computing: Instructional Uses, Misuses, and Needed Improvements." Computers in the Schools. Summer, 1986, pp. 73-79.

Slavin, Robert E. " Cooperative Learning and Student Achievement." Educational Leadership. October, 1988, pp.31-33.

Showers, Beverly, Bruce Joyce, and Barrie Bennett. "Synthesis of Research on Staff Development: A Framework for Future Study and a State-of-the-Art Analysis." Educational Leadership. November, 1987, pp. 77-87.

Vernot, David. " Thirteen Concerns Teachers Still Raise About Computers." Instructor Special Hi-Tech Issue. Fall, 1987, pp.17-18.

Wolf, Dennie and Joseph Walthers. " The Writer With A Word Processor: Juggler, Sculptor, Director." Computing in the Schools. Winter, 1986, pp.35-45.

Appendix A

A Comparison of Class Size

APPENDIX A

A COMPARISON of AVERAGE CLASS SIZE

Grade	1986-1987	1987-1988
K	26.0	26.4
1	26.0	26.5
2	19.6	26.9
3	27.7	25.3
4	28.6	31.8
5	23.7	34.2
6	31.2	32.0

Appendix B

Comparison of Percentage Not Promoted in the School Years of 1985-1986 and 1986-1987

APPENDIX B

COMPARISON OF PERCENTAGE NOT PROMOTED

IN THE SCHOOL YEARS OF

1985-1986 and 1986-1987

Grade	1985-1986	1986-1987
K	3.9	4.5
1	2.6	11.8
2	0.0	7.6
3	1.2	4.3
4	0.0	1.7
5	.07	1.1
6	0.0	3.7

APPENDIX C

TEACHERS' SURVEY

Name _____

Grade _____

Class size _____

CHECK THE NUMBER THAT BEST DESCRIBES YOUR REACTION TO EACH STATEMENT.

1 very strongly disagree
2 strongly disagree
3 neutral
4 strongly agree
5 very strongly agree

1 2 3 4 5	I have too many students in my classroom.
1 2 3 4 5	The number of students affects the learning process in my classroom.
1 2 3 4 5	I need more small group and individualized instruction in my classroom.
1 2 3 4 5	The noise level is high in the pod area.
1 2 3 4 5	I have no room for small group instruction in my area.
1 2 3 4 5	I feel frustrated due to the overcrowded conditions.
1 2 3 4 5	I am comfortable using computer-assisted instruction.
1 2 3 4 5	I know how to use computers to assist classroom instruction.

APPENDIX D

Teachers' Survey of Computer Related Topics

PLEASE CHECK THE APPROPRIATE BOXES.

1. Have you taken any computer courses? __ yes __ no

2. Are you computer literate ? __ yes __ no

3. Do you presently use computers to assist your instructional program? __ yes __ no

   If yes, ____ with an aide ____ without an aide

4. If you had materials, would you use computers to assist your instructional program? __ yes __ no

   If yes, check all that apply.

   ____ Language Arts ____ Mathematics

   ____ Social Studies ____ Science

   ____ Critical Thinking ____ other

5. Would you be interested in an inservice to learn how to use computers to assist your instructional program? __ yes __ no

   If yes, check all that apply.

   ____ Language Arts ____ Mathematics

   ____ Social Studies ____ Science

   ____ Critical Thinking ____ other

APPENDIX E

STUDENTS' SURVEY

Grade _____

PLEASE PUT A CHECK ( ) IN THE CORRECT BOX.

1. Do you have a home computer? __ yes __ no

2. If the answer is yes, do you use the computer for:

Check all that apply.

____ Math practice ____ games

____ writing stories ____ other

3. Do you use computers in school during the week?
__ yes __ no

If yes, is it in

____ Comp Ed.

____ regular classroom

____ Special Ed.

4. Is your pod area noisy? __ yes __ no

5. Do you find it hard to work in your classroom?
__ yes __ no

Appendix F

IMPLEMENTATION SCHEDULE

Staff Development Activities:

Week 1

1. Ensure all computers are placed in the laboratory.
2. Call district computer education department to identify the name of a CAI instructor.
3. Schedule inservice training on the computers and the software for second and fourth grade teachers.

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1. Explain CAI and the implementation at the faculty meeting.
2. Organize a school-based computer committee.
3. Hold the initial inservice training session.
4. Meet with computer committee.

Weeks 2-4

1. Ongoing inservice training with teachers.

Weeks 3-10

1. Schedule bi-weekly meetings to monitor progress of the computer committee Administrative/ Supervisory Activities.

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1. Meet with school administrative team.

2. Meet with grade level chairpersons.

3. Order necessary materials.

4. Articulate with compensatory education teacher, computer aide, instructional aides, and second and third grade teachers.

5. Order additional software if necessary.

Week 2

1. Work with staff to identify student target population.

2. Group students

3. Provide teachers with lists of students in the target population.

4. Schedule weekly meeting with the computer aide and the teachers involved.

Weeks 3-10 Weekly Activities

1. The writer will observe at least one class per day in the computer lab and observe classroom utilization of computers.

2. Review computer printouts of each student in the target group to monitor progress.

3. Meet with teachers and computer aide to monitor progress, obtain feedback, and make curriculum adjustments if necessary.

Student/Classroom Implementation Activities:

Week 2

1. Administration of pretest and placement of students.

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1. The target group, those students who failed to master 4 or more skills on the sample SSAT will begin implementation in the computer laboratory as well as in the classrooms.

Weeks 4-10 implementation will continue.

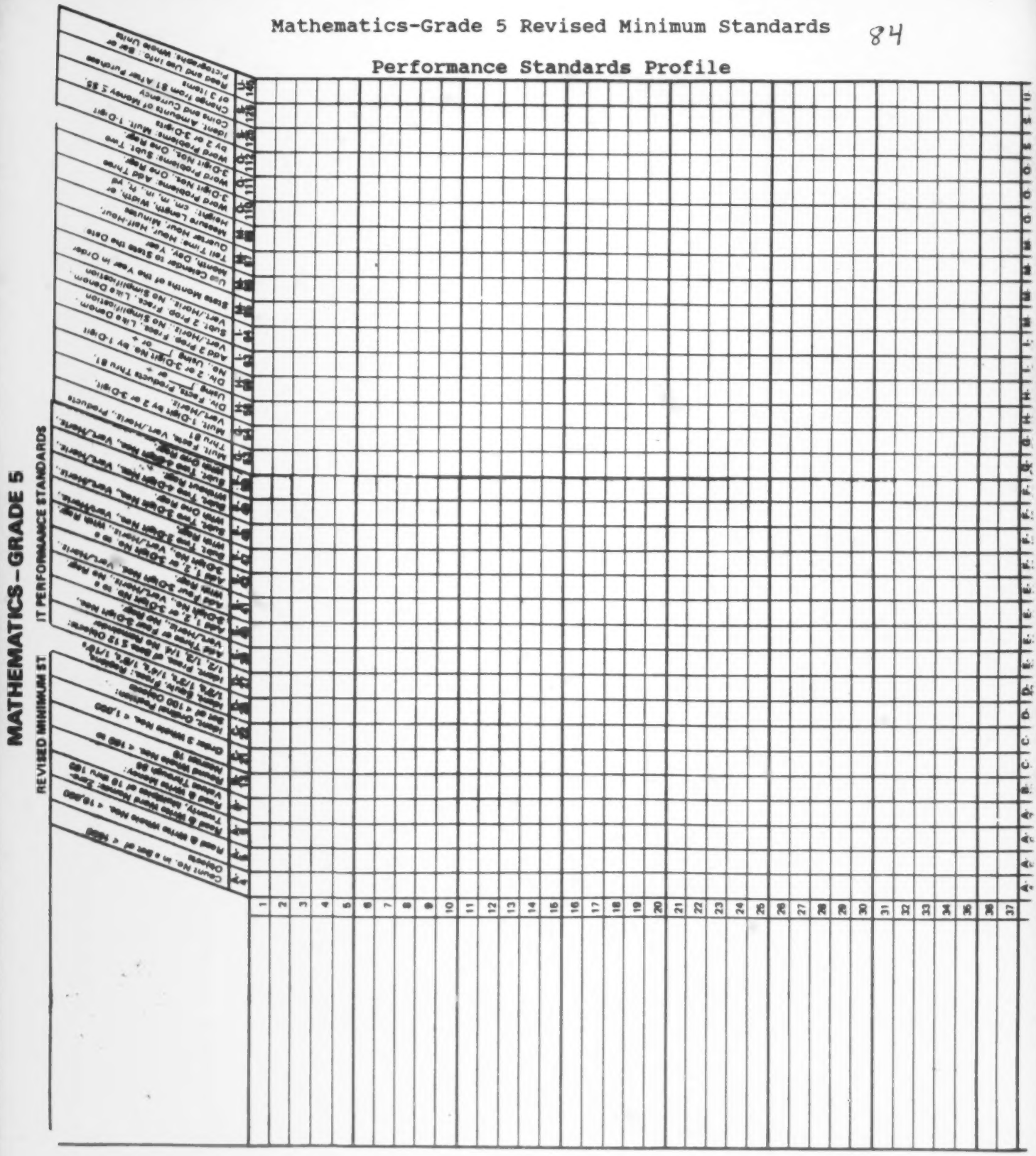
Week 10

1. Administration of posttest.

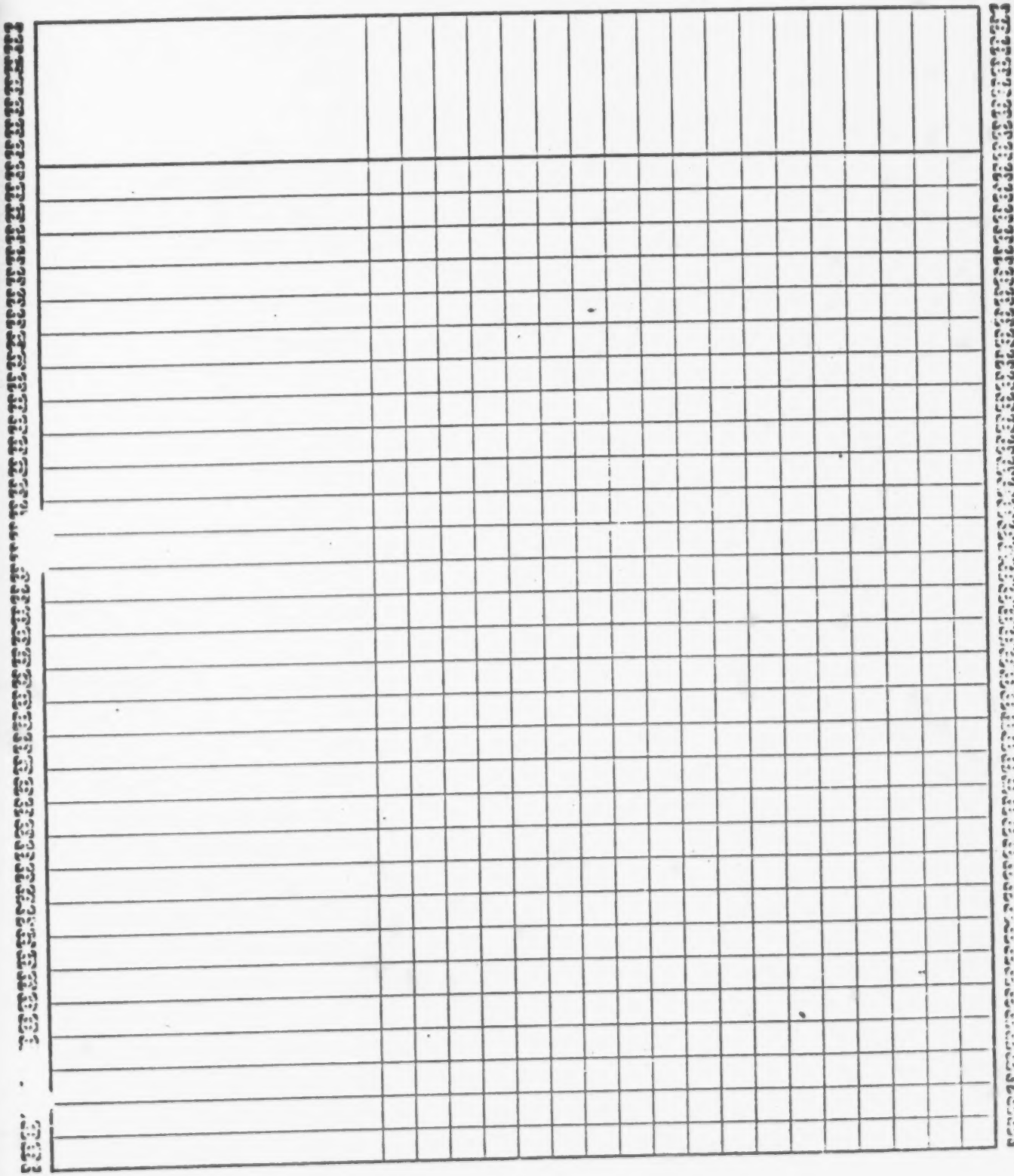
Mathematics-Grade 5 Revised Minimum Standards

84

Performance Standards Profile



All-Purpose Computer Chart



Appendix I

SSAT Skills and Related MECC Software

SSAT Skill Number	MECC Program
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E 40	Circus Math/Addition Logician
E 41	Circus Math/Addition Logician
E 42	Circus Math/Addition Logician
F 47	Subtraction Puzzle
F 48	Subtraction Puzzle
F 49	Subtraction Puzzle
F 50	Subtraction Puzzle
G 53	Number Munchers/Multiplication Puzzles/Quotient Quest
G 54	Number Munchers/Multiplication Puzzles/Quotient Quest
M 87	Clock Works
S 125	Money Works
S 126	Money Works

Pretest

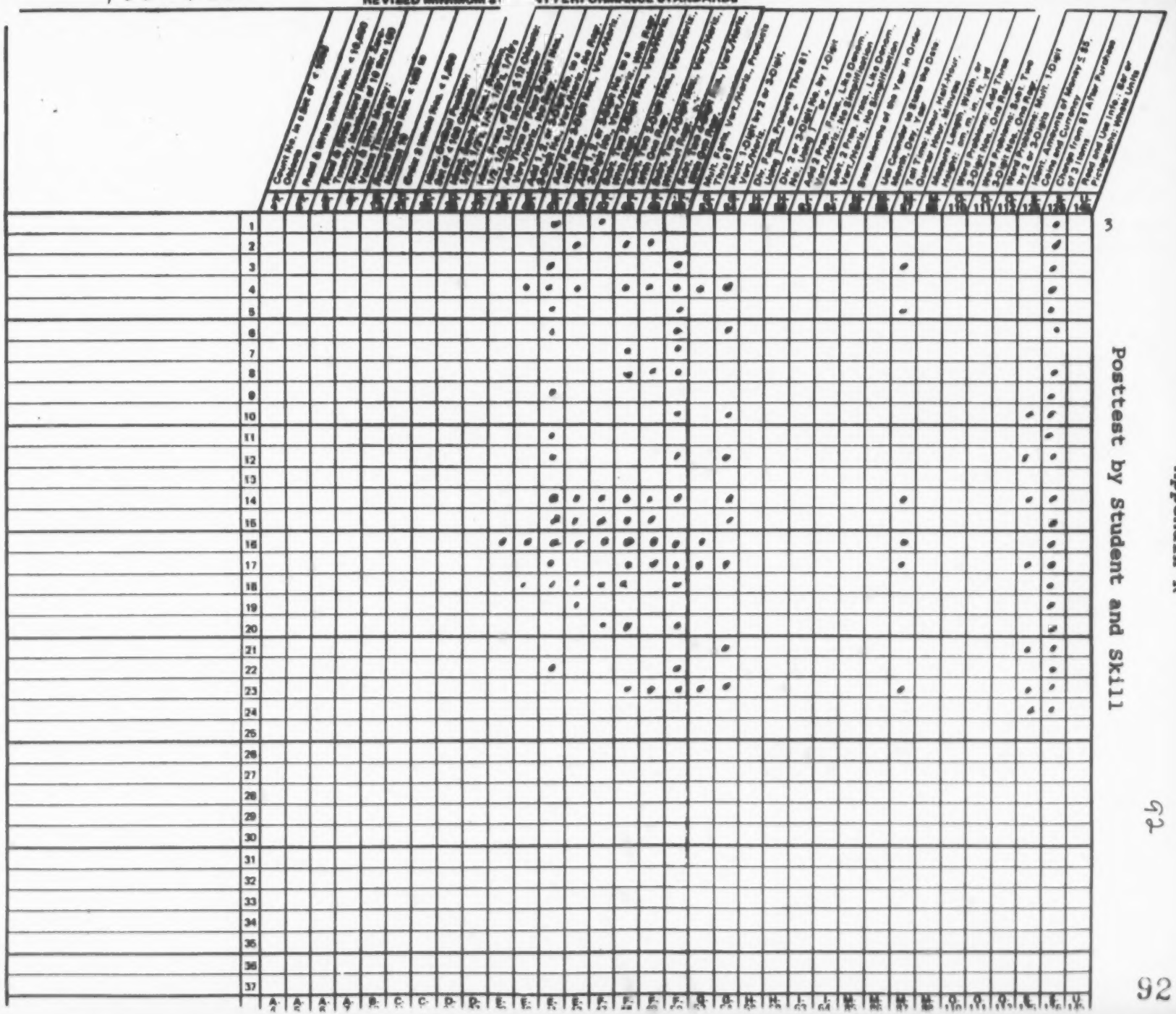
MATHEMATICS—GRADE 8

REVISED MINIMUM ST | IT PERFORMANCE STANDARDS

Appendix J

Pretest by Student and Skill

Post-test



Posttest by Student and Skill

Appendix K

Dear Nova Alumni:

The decrease in scores in mathematics and writing on the Statewide Student Assessment Test (SSAT) of third and fifth grade students was addressed by this practicum. The purpose was to implement a computer-assisted instructional program for second and fourth grade students in order to provide the drill and practice as well as the remediation of skills requiring mastery on the SSAT. The practicum program contained three components: staff development activities, administrative/supervisory activities, and student activities which were implemented concurrently. It was concluded that a modified computer-assisted instructional program should be one of several teaching strategies integrated into the classroom activities in order to ensure skills mastery. Appendices include teachers' surveys, student surveys, a revised minimum standards performance profile, an all purpose computer chart, and student data. I hope that the dissemination packet will be of some help to you.

Sincerely,

Judith Mager

Judith Mager

Annotated Bibliography

Staff Development in Computer-Assisted Instruction

Cicchelli, Jerry. "Resolute Leadership Erases Resistance to Technology." Electronic School. July, 1987, pp.11-13.

The article discussed the plan the superintendent established to enhance computer education in one district. The plan attempted to counteract staff reluctance by creating a staff development program to train teachers in curriculum- specific uses of computers. The article also included plans for school level implementation.

Gandy, Thomas. "The Inservice Workshop: When You're Responsible for Introducing Other Teachers to the Mysteries of Micros." Classroom Computer Learning. May, 1987, pp.27-31.

This article stated that many teachers have an inherent fear of computers. Reducing these fears of intimidated teachers is no easy task.

Joyce, Bruce, Beverly Showers, and Carol Rolheiser-Bennett. "Staff Development and Student Learning:A Synthesis of Research on Models of Teaching." Educational Leadership. October, 1987, pp.11-23.

This article cited highlights of research on staff development gleaned from nearly 200 research studies. It also provided the reader with a review of the literature. The article cited studies with substantiated cooperative learning strategies in staff development.

Showers,Beverly, Bruce Joyce, and Barrie Bennett. "Synthesis of Research on Staff Development:A Framework for Future Study and a State-of-the-Art Analysis." Educational Leadership. November, 1987, pp.77-87.

This article compiled research pertinent to staff development accumulated over a ten year period. Most of the research concerning staff development has been conducted during the last 20 years. The studies were classified into such variables as teacher characteristics, characteristics of schools and school systems, staff development programs, and student characteristics.

Teacher Utilization of Computer-Assisted Instruction

Eiser, Leslie. "Help, I'm Drowning in Paperwork." Classroom Computer Learning. February, 1987, pp. 26-29.

The article stated that teacher proficiency would improve if the teachers could concentrate on teaching - not calculating. The purpose of the article was to aid in the selection of the best software package to fit each personal style of grading student performance. The article provided examples of software programs to meet the teachers' grading scheme.

Fisher, Glen. "Is The Computer Movement Dead?" Instructor. May, 1987, p.27.

This article discussed the creativity of the second-wave teachers who use computers. Literacy has given way to word processing, data bases, spreadsheets,and other software that fits their curriculum. Teachers must convince administrators to provide more time, training, and access to information about good software and how it relates to curriculum.

Keizer, Gregg. "Editorial License." Compute! October, 1988, p.4.

The article declared that computers can't teach by are tools of the trade which bring order to chaos. Computer labs are a dismal failure because they don't put the computers where they belong - in the classroom. Teachers should be able to manipulate and retrieve

information from their desks. By using the computer to generate tests, keep grades, take notes, schedule lessons, and create progress reports, the teachers become more productive by becoming more organized. Less time with paperwork frees the teachers to do what they do best, teach.

"OTA Report: New Technologies Are Making A Difference." Classroom Computer Learning, October, 1988, pp. 33-42.

The report was conducted for the United States Congress on the past, present, and future impacts of technologies on education. The report produced one major theme. Technology is changing schools and is having a positive effect on both teachers and students. The report also examined such issues as the cost-effectiveness of instructional technologies, teacher training, and the educational software market.

Wolf, Dennie and Joseph Walthers. "The Writer With A Word Processor: Juggler, Sculptor, Director." Computing in the Schools. Winter, 1986, pp. 35-45.

The article stated that the word processor is the most important tool for teaching creative writing. The authors discussed teaching strategies for teachers from kindergarten through twelfth grade.

Teachers Attitudes Toward Computers

Hoelscher,Karen. "Computing and Information: Steering Studies Learning." Computers in the Schools. Winter, 1986, pp.23-27.

This article discussed the importance of teachers accepting technological changes as a challenge rather than a crisis. One can seize the opportunities to use new technologies to help students explore their individual potentials. The skills applications necessary to use
these technologies to work with information in different ways enhances the power of the computer as a

thinking tool.

Reed, Michael. "Teachers' Attitudes Toward Educational Computing: Instructional Uses, Misuses, and Needed Improvements." Computers in the Schools. Summer, 1986, pp. 73-79.

This article outlined a survey of teachers on computer priorities. The most valuable uses were to provide instruction on computer literacy and awareness, to assist the teacher with managing instruction, and provide drill and practice. Spreadsheets, data bases, and software for keeping and averaging grades were also important to teachers.

Computer-Assisted Instruction to Motivate Students

Bryant, Karen, Bob Speilvogel, and Kay Gore. "Is Technology Really Helping Anyone?" Instructor Special Hi-Tech Issue. Fall, 1987, pp.18-20.

This article declared that the computer provides the students with the ability to control technology. Through the use of computers, the students develop the ability to use logic and mechanical skills not tapped when listening or writing on paper. Computers also teach collaboration, and students learn to communicate.

Fromberg, Doris Pronin and Maryanne Driscoll. The Successful Classroom. Teachers College, Columbia University. New York; 1985.

This book provided strategies to create a successful learning environment for every child. It pointed out that a sense of power in learning is more likely to make children feel more receptive to take on challenges and risks in future learning. The authors recommended that computer literacy should be taught through the applications in the content areas. Planners should plan for computer-assisted instruction, find ways to utilize computers to enhance learning, and seek opportunities to integrate them into the curriculum.

Helms, Donald. "Commitment to Technologies Multiplies Curriculum Power." Electronic School. July, 1987, pp. 5-7.

The author of this article emphatically stated that technology will never replace the good teacher. It is an immensely powerful tool for education. It can motivate and direct teaching. By analyzing the scope, sequence, and content of the curriculum, one can maximize the use of new technology in education.

Merriman, Howard. "Computers and Robotics Roll Back Frontiers of Learning." Electronic School. July, 1987, pp. 8-11.

This article stated that previously students were learning computer language while today they are using computer technology to enhance the curriculum in all areas. Computers can motivate, excite, and turn on students to education and generate excitement in the teaching staff. The job of administrators is to help staff members understand that computers will enable them to do their jobs easier, faster, and better. The job of the teachers is to make computer companies understand the needs of education.

Cooperative Learning

Mathur, Rajeshwar N. and Brahm Prakash. "Individually Guided System of Instruction:A Cooperative Learning Strategy." Educational Technology. February, 1988, pp. 45-47.

This article outlined the Individually Guided System of Instruction (IGSI). The teacher explains the system to the tutors. The pupil learns to take the initiative in self learning with the help of the tutors. When the student feels comfortable, a mastery test is administered. The strategy provides learning from the teacher, self-study, fellow students, and application.

Slavin,Robert E. "Cooperative Learning and Student Achievement." Educational Leadership. October, 1988, pp. 31-33.

This article detailed how cooperative learning has been proposed as a solution to many educational problems. Two conditions, a group goal and individual accountability, are essential if the achievement effects of cooperative learning are to be realized. Cooperative learning has positive effects on self-esteem and intergroup relations.

Implementation Plans for Computer-assisted Instruction

Hertzke, Eugene R. "This Computer Network Turns A Management Nightmare Into A Teacher's Dream." Electronic School. July, 1987, pp. 19-20.

This article outlined one plan for computer-assisted instruction utilizing a computer laboratory. The effects are to reduce the teacher/student ratio, effectively track student progress, rate of success, and level of achievement. The use of computers also improve problem-solving skills.

Vernot, David. "Thirteen Concerns Teachers Still Raise About Computers." Instructor Special Hi-Tech Issue. Fall. 1987, pp. 17-18.

This article suggested several strategies for relieving the concerns teachers have expressed about computers. The article also discussed an implementation plan utilizing computer use with large group demonstrations and interactions as well as a plan to address individual access to the computer without distracting the rest of the class. Several recommendations for methods for obtaining good software were outlined. The author concluded by stating that the computer is a tool to aid the teacher in providing students with experiences and information.

APPENDIX A

A COMPARISON of AVERAGE CLASS SIZE

Grade	1986-1987	1987-1988
K	26.0	26.4
1	26.0	26.5
2	19.6	26.9
3	27.7	25.3
4	28.6	31.8
5	23.7	34.2
6	31.2	32.0

APPENDIX B

COMPARISON OF PERCENTAGE NOT PROMOTED

IN THE SCHOOL YEARS OF

1985-1986 and 1986-1987

Grade	1985-1986	1986-1987
K	3.9	4.5
1	2.6	11.8
2	0.0	7.6
3	1.2	4.3
4	0.0	1.7
5	.07	1.1
6	0.0	3.7

APPENDIX C

TEACHERS' SURVEY

Name _____

Grade _____

Class size _____

CHECK THE NUMBER THAT BEST DESCRIBES YOUR REACTION TO EACH STATEMENT.

1 very strongly disagree
2 strongly disagree
3 neutral
4 strongly agree
5 very strongly agree

1 2 3 4 5	I have too many students in my classroom.
1 2 3 4 5	The number of students affects the learning process in my classroom.
1 2 3 4 5	I need more small group and individualized instruction in my classroom.
1 2 3 4 5	The noise level is high in the pod area.
1 2 3 4 5	I have no room for small group instruction in my area.
1 2 3 4 5	I feel frustrated due to the overcrowded conditions.
1 2 3 4 5	I am comfortable using computer-assisted instruction.
1 2 3 4 5	I know how to use computers to assist classroom instruction.

Appendix D

Teachers' Survey of Computer Related Topics

PLEASE CHECK THE APPROPRIATE BOXES.

1. Have you taken any computer courses? __ yes __ no

2. Are you computer literate ? __ yes __ no

3. Do you presently use computers to assist your instructional program? __ yes __ no

   If yes, ____ with an aide ____ without an aide

4. If you had materials, would you use computers to assist your instructional program? __ yes __ no

   If yes, check all that apply.

   ____ Language Arts ____ Mathematics

   ____ Social Studies ____ Science

   ____ Critical Thinking ____ other

5. Would you be interested in an inservice to learn how to use computers to assist your instructional program? __ yes __ no

   If yes, check all that apply.

   ____ Language Arts ____ Mathematics

   ____ Social Studies ____ Science

   ____ Critical Thinking ____ other

APPENDIX E

STUDENTS' SURVEY

Grade _____

PLEASE PUT A CHECK ( ) IN THE CORRECT BOX.

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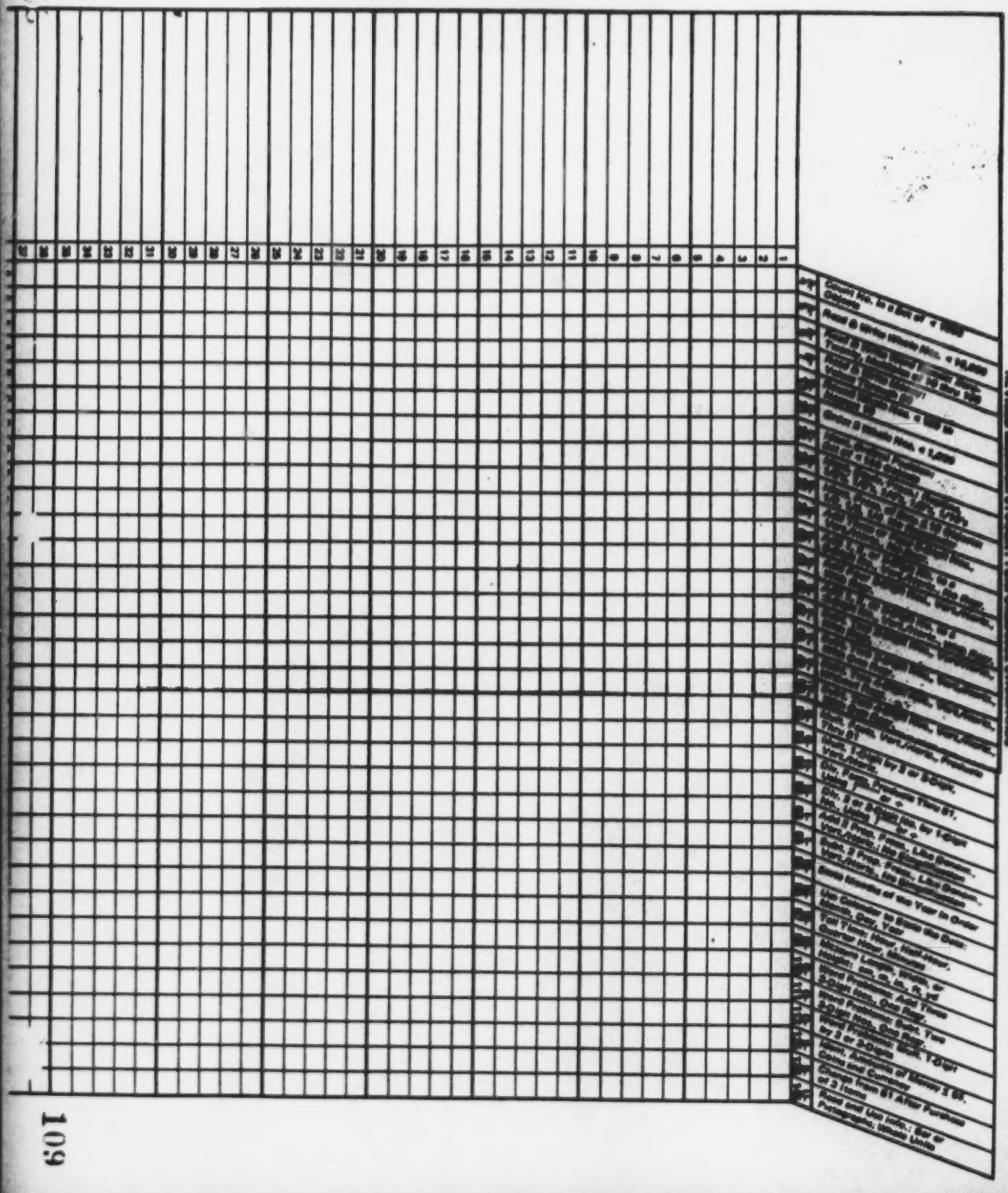
Appendix G

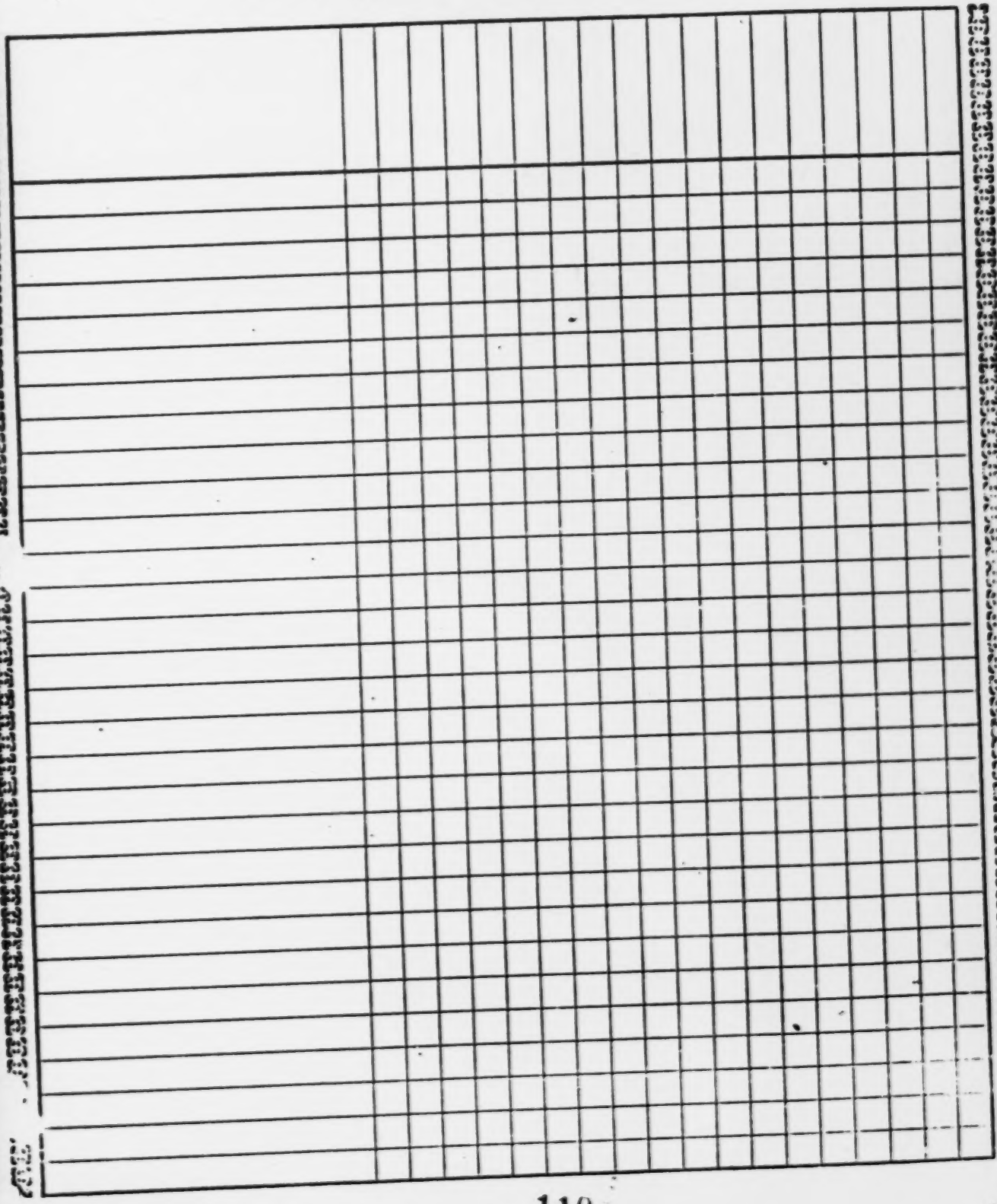
Mathematics-Grade 5 Revised Minimum Standards

Performance Standards Profile



Appendix H

All-Purpose Computer Chart



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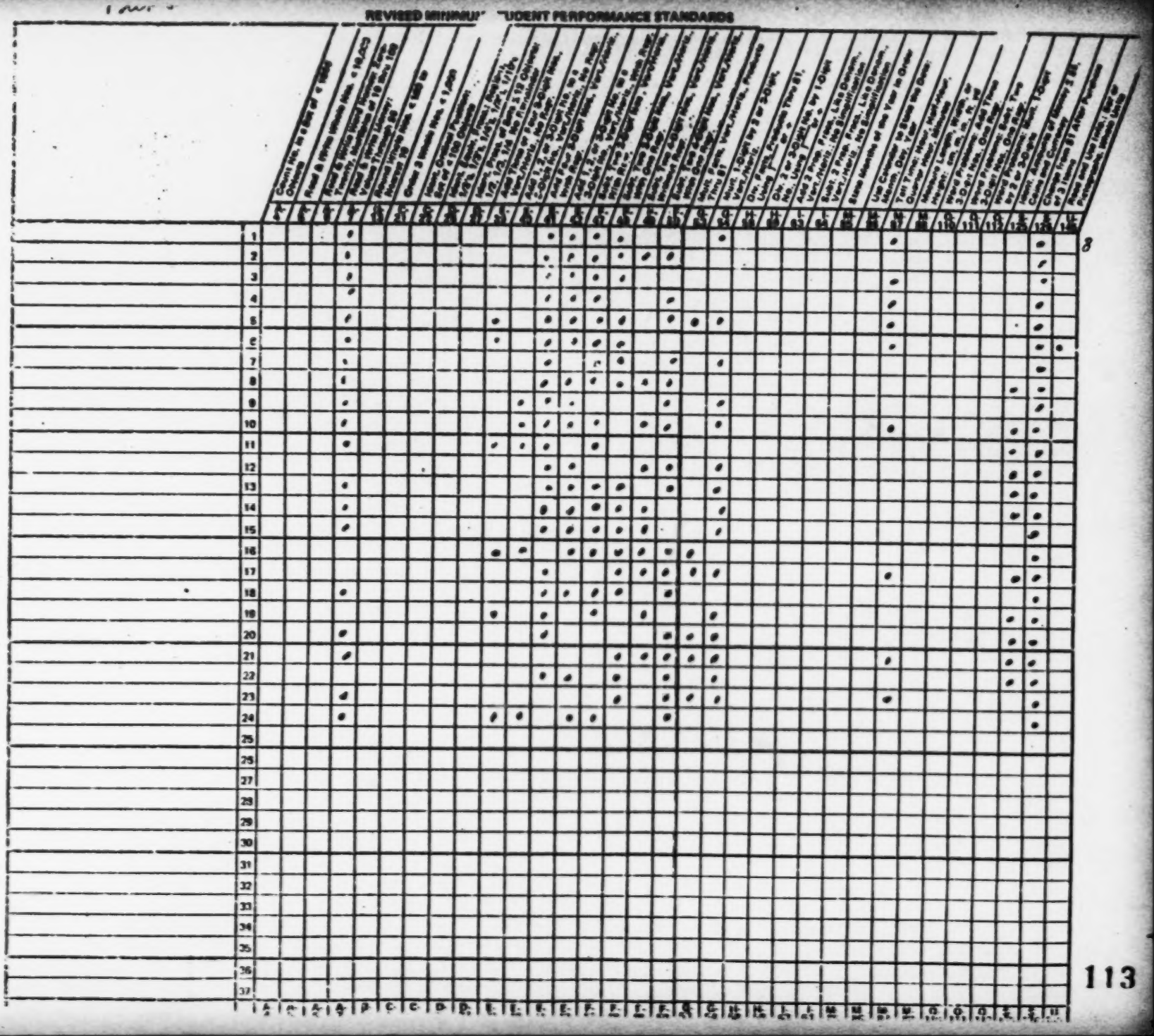
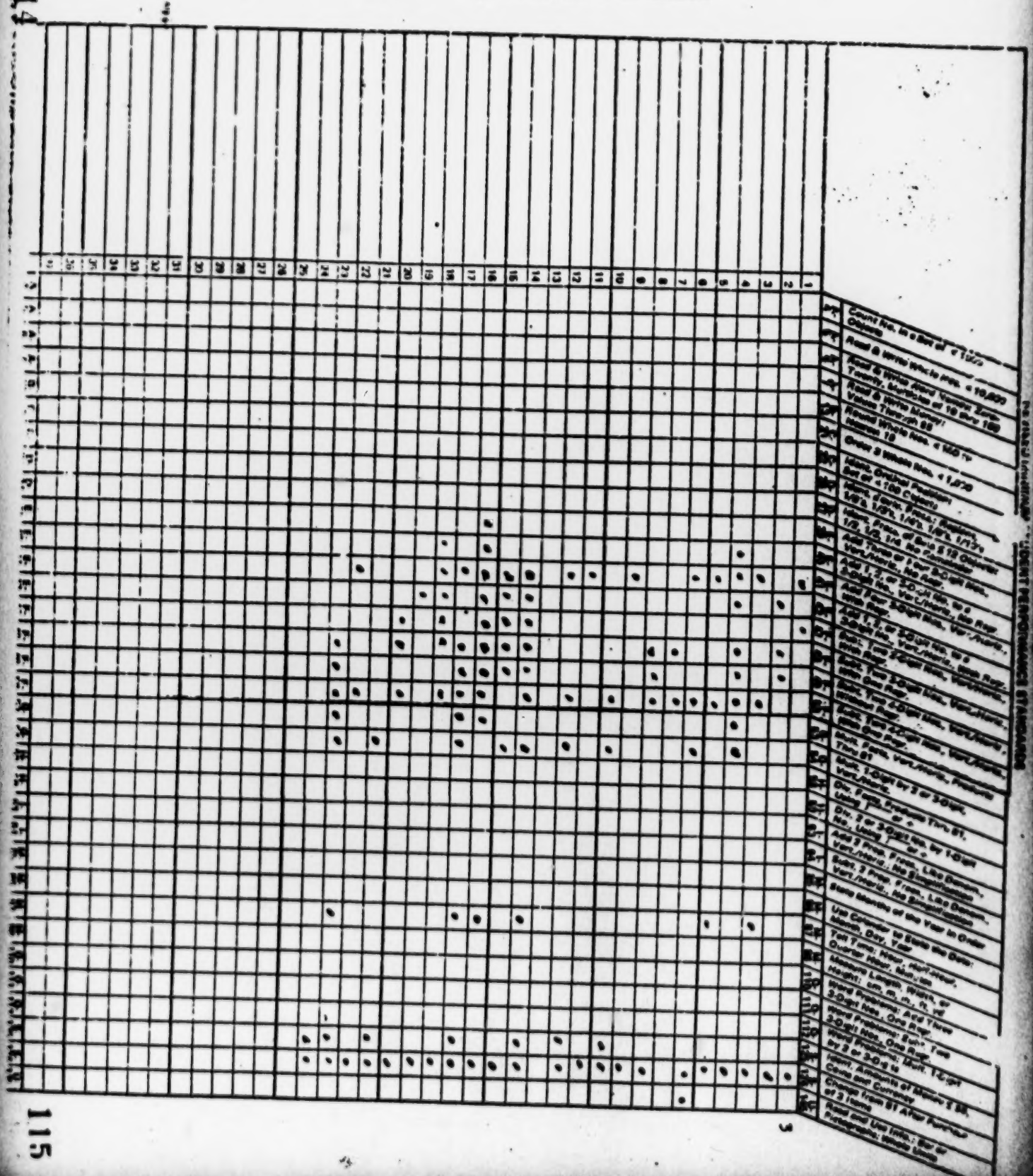


Appendix K

Posttest by Student and Skill


STUDENT PERFORMANCE STANDARDS
Count No. to a Set of 1 thru 10 Objects
Read & Write Whole Nos. < 10,000
Read & Write Word Names for Numbers Twenty, Number of 10 thru 100
Read & Write Number Names Thru 99
Round Whole Nos. < 1,000 to Nearest 10
Order 3 Whole Nos. < 1,000
Ident. Ordinal Position Set of < 100 Objects
Ident. & Name Fract. Equiv. 1/2 & 1/4
Ident. & Name Fract. Equiv. 1/2, 1/3, 1/4 to 1/12
Add Three or Four 3-Digit Nos., Vert./Horiz., No Regr.
Add 1, 2, or 3-Digit No. to a 3-Digit No., Vert./Horiz., No Regr.
Add Four 3-Digit Nos., Vert./Horiz., With Regr.
Add 1, 2, or 3-Digit No. to a 3-Digit No., Vert./Horiz., With Regr.
Subt. Two 3-Digit Nos., Horiz., With One Regr.
Subt. Two 3-Digit Nos., Vert./Horiz., Without Regr.
Subt. Two 3-Digit Nos., Vert./Horiz., With One Regr.
Mult. Facts, Vert./Horiz., Products Thru 81
Mult. 1-Digit by 2 or 3-Digit, Vert./Horiz.
Div. Facts, Products Thru 81, Using 1 or 2
Div. 2 or 3-Digit No. by 1-Digit No., Using 1 or 2
Add 3 Pos. Frac., Like Denom., Vert./Horiz., No Simplification
Subt. 2 Pos. Frac., Like Denom., Vert./Horiz., No Simplification
Name Months of the Year in Order
Use Calendar to State the Date: Month, Day, Year
Tell Time: Hour, Half-Hour, Quarter Hour, Min. to Hour
Measure Length, Width, or Height: cm, m, in, ft, yd
Word Problems: Add Three 3-Digit Nos., One Regr.
Word Problems: Subt. Two 3-Digit Nos., One Regr.
Word Problems: Mult. 1-Digit by 2 or 3-Digit to Ident. Amounts of Money $ $$, Cents and Combine
Change from $1 After Purchase of 2 Items
Read and Use Info. Bar or Pictographs, Whole Units